

54. An organic photosensitive optoelectronic device comprising:  
a substrate having a first major surface and a second major surface; and  
at least two subcells in superposed relationship upon said first major surface  
of said substrate;  
wherein at least one of said subcells comprises:  
two transparent metal substitute electrode layers in superposed  
relationship upon said first major surface of said substrate; and  
four photoconductive organic layers, having an inner pair and an outer  
pair, disposed between said two transparent metal substitute electrode layers.
55. The device of claim 54 wherein said inner pair of said four photoconductive organic  
layers consists of a pair of photoconductive organic layers selected to form a photovoltaic  
heterojunction and selected to have spectral sensitivity in a specified region of the  
electromagnetic spectrum.
56. The device of claim 55 wherein said pair of photoconductive organic layers comprises  
aluminum *tris*(8-hydroxyquinoline) and 4,4'-bis[N-(1-naphthyl)-N-phenyl-amino]biphenyl.
57. The device of claim 54 wherein at least one of the two transparent metal substitute  
electrode layers consists of a conductive oxide.
58. The device of claim 57 wherein the conductive oxide is selected from the group  
consisting of indium tin oxide, tin oxide, gallium indium oxide, zinc oxide and zinc indium  
oxide.
59. The device of claim 54 wherein at least one of the two transparent metal substitute  
electrode layers consists of a conductive polymer.
60. The device of claim 54 wherein the at least two subcells have external electrical

connections.

61. The device of claim 60 wherein the at least two subcells are electrically connected in parallel.

62. The device of claim 54 wherein each of the at least two subcells comprises:  
two transparent metal substitute electrode layers in superposed relationship upon said first major surface of said substrate; and  
four photoconductive organic layers, having an inner pair and an outer pair, disposed between said two transparent metal substitute electrode layers.

63. An organic photosensitive optoelectronic device comprising:  
a substrate having a first major surface and a second major surface; and  
at least two subcells in superposed relationship upon said first major surface of said substrate;  
wherein each of the at least two subcells has external electrical connections;  
and  
wherein at least one of said subcells comprises:  
two transparent metal substitute electrode layers in superposed relationship upon said first major surface of said substrate; and  
at least one photoconductive organic layer disposed between said two transparent metal substitute electrode layers.

64. The device of claim 63 wherein the at least two subcells are electrically connected in parallel.

65. The device of claim 64 wherein each of the at least two subcells comprises:  
two transparent metal substitute electrode layers in superposed relationship upon said first major surface of said substrate; and

at least one photoconductive organic layer disposed between said two transparent metal substitute electrode layers.

66. The device of claim 65 wherein the thickness of each of the at least two subcells is optimized for maximum internal quantum efficiency and the total number of said subcells comprised in the organic photosensitive optoelectronic device is limited by that which produces no further increase in the external quantum efficiency.

67. The device of claim 63 wherein at least one of the two transparent metal substitute electrode layers consists of a conductive oxide.

68. The device of claim 63 wherein at least one of the two transparent metal substitute electrode layers consists of a conductive polymer.

69. The device of claim 63 wherein the at least one photoconductive organic layer is four photoconductive organic layers, having an inner pair and an outer pair.

70. The device of claim 69 wherein at least one of said outer pair of said four photoconductive organic layers comprises an organic molecular crystal material.

71. The device of claim 69 wherein at least one of said outer pair of said four photoconductive organic layers comprises a polymeric material.

72. The device of claim 69 wherein at least one of said outer pair of said four photoconductive organic layers comprises a material selected from the group consisting of phthalocyanine compounds, perylene compounds, polyacene compounds, and porphyrin compounds.

73. The device of claim 69 wherein at least one of the two transparent metal substitute